

Compact, Robust, Low Power High Sensitivity Gas Sensor, Phase I

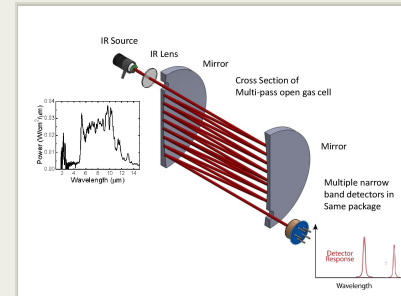
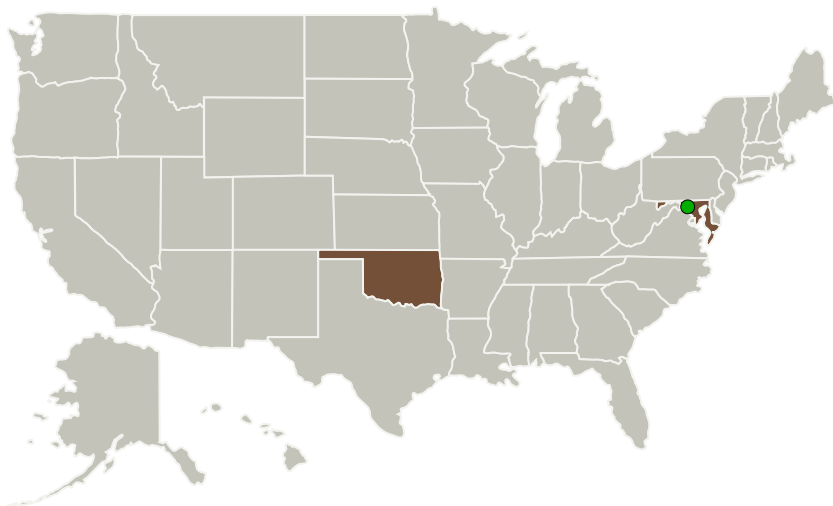
Completed Technology Project (2016 - 2016)



Project Introduction

Miniaturized gas sensors with high sensitivity that are compact, low power and low weight are needed to support for NASA's airborne science missions, particularly those utilizing the Global Hawk, SIERRA-class, Dragon Eye or other unmanned aircraft. These UAV gas sensors are intended as calibration/validation systems for space-based measurements and/or to provide local measurements not available from space-based instruments. In this SBIR program, Amethyst Research will develop a non-dispersive infrared (NDIR) gas sensor that is capable of measuring multiple gases with absorption in the Mid to far infrared spectra with high accuracy. The envisioned system will be compact, light weight and operate at low power with detection discrimination in the ppb range. The system's performance is made possible by Amethyst's recently developed high sensitivity narrow band infrared detector that can be tuned to detect only light in the absorption band of the individual gas. This unique detector enables a low cost / low power infrared source to be used to measure individual gas concentrations at high accuracy by measurement of the absorption of the gas's unique absorption band in this spectral region. Multiple detectors, each tuned to detect a certain gas, can be packaged together to construct a multi-gas sensor.

Primary U.S. Work Locations and Key Partners



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Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Amethyst Research Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Ardmore, Oklahoma
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland	Oklahoma
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Project Transitions

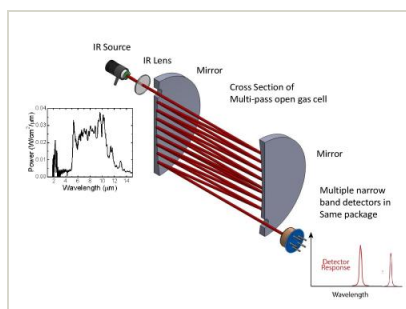
▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140397>)

Images



Briefing Chart Image

Compact, Robust, Low Power High Sensitivity Gas Sensor, Phase I
(<https://techport.nasa.gov/image/129423>)



Final Summary Chart Image

Compact, Robust, Low Power High Sensitivity Gas Sensor, Phase I
Project Image
(<https://techport.nasa.gov/image/126199>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Amethyst Research Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

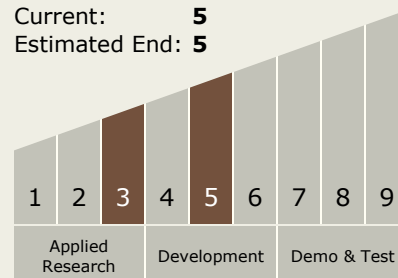
Carlos Torrez

Principal Investigator:

Keith Jamison

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System